THE MEMBERS MAGAZINE OF THE NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY
VOL. 13 NO. 3 WINTER 1975

Terra

THE INSECT IN HUMAN SYMBOLISM

Letters

Editor's Note:

TERRA is grateful for its mail. We try to answer all of it, though sometimes we lose a letter or two. We print those we think will interest Museum members. Three months ago we received the following letter:

This is a very belated thank you for your Spring, 1974, edition of Terra. I always enjoy the magazine, but this one is really exceptional. The articles on the poppies and General Otis (who was a friend of my grandfather's) were outstanding. I also very much enjoyed "The Little Bird That Was."

I do not particularly recall the first "round-the-world Flight," but I do remember the first Aviation Meet that was held here at Dominguez Field. That was the time when Paulhan went up over a mile. The excitement was terrific. In those days we went down to Dominguez Field and most other places in the "big red cars" of the Pacific Electric.

My father had an automobile — a Baker Electric, but as it had to be recharged every 100 miles, he would not go that far if he could possibly avoid it. As I remember, we had to stand most of the ride down and back, interspersed with a long, long walk from the car to the reviewing stand. The events were so exciting that we continued to jump up or stand most of the afternoon.

Thank you again for an especially outstanding issue.

Mrs. Chester A. Rude

We called Mrs. Rude to see if she would consider expanding her letter into a TERRA article, providing pictures could be found in the Natural History Museum's archives to illustrate it.

She was skeptical, then intrigued. "I've never written professionally before," she confided, "just for my church. And I'm deep in my seventies."

"You're ripe for a new career," we urged. She concurred.

Mrs. Rude visited the Museum's archives, where with the help of John Cahoun, Archivist, James Zordich, Associate Curator, Transportation Collections, and William Mason, Curator of Southern California History and Archives, several photographs were brought forth and chosen.

The article speaks for itself.

Ed.

"Backward, turn backward, oh time in your flight, make me a child again just for tonight"

by **Lorraine Frankenfield Rude**

The ten days, from January 10th to 20th, 1975, marked the sixty-fifth anniversary of the first Aviation Meet in the United States, held at Dominguez Field, a wide expanse of open country, not far from where Compton now stands.

I was half past thirteen, trying hard to make up to my father for not being the boy he so wanted, by being exceptionally interested in all subjects that interested him, especially aviation.

For weeks the papers were full of maps, statistics which seemed overwhelmingly large then and mere toy records now. In those days most people went down to Dominguez Field (and most other places) in the "Big Red Cars" of the Pacific Electric. My father had an automobile, a Baker Electric; but as it had to be recharged every hundred miles, he would not drive it out of the city if he could possibly avoid it.

We bought admission tickets in advance, I think through the infant Automobile Club, and books of car tickets. As I remember, we had to stand most of the ride down and back, interspersed with a long, long walk from the car to the Reviewing Stand. Ladies were wearing long skirts that year with "dust ruffles" under the hems, hopefully to keep dust from going to the top of their high-laced or buttoned shoes. They also wore huge hats, skewered with long, ornate hat pins. The one advantage to being only thirteen was that I didn't have to walk in those long skirts and my hat was a modest size, held on by an elastic. The road was deep in dust, the wind blew with sudden gusts which threatened to put the hats into competition with the planes.

Once in the stands the events were so exciting that we continued to jump up or stand most of the afternoon. On January 12 Paulhan went up over 4,000 feet, almost a mile — the highest altitude man had ever flown.

There were many events, each thrilling in itself — but on the eighteenth of January came the high dramatic point of the meet for me. Paulhan decided to fly to Santa Anita and back, approximately seventy five miles, apparently to set a distance record.

continued on page 30

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The Members magazine of
THE NATURAL
HISTORY MUSEUM ALLIANCE
of Los Angeles County
VOL. 13/NO. 3 WINTER 1975

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Printed by North Hollywood Printing Co., Inc.
Color separations by Computer Color Corp.

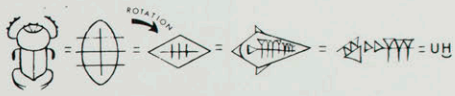
THE INSECT IN HUMAN SYMBOLISM

by **Charles L. Hogue**

Various cultures, past and primitive, have adapted animal forms, among them insects and related terrestrial arthropods, as symbols in their language, philosophy, mythology and religion. This use of an insect image to suggest or denote something else than itself, an idea, or quality, often abstract, is to be recognized as true symbolism and distinguished from purely linguistic, artistic or pragmatic representations or venerations of the insect.

To explain the origin of the symbolic use of an insect is frequently difficult. The simplest explanation, and probably most often the correct, for adopting a species into symbolism is a recognition in it of some anthropomorphic quality, whether anatomical, behavioral or ecological. By association the quality gives the insect a special significance in the lives of the people. It may at first play a part in their mythology, little changed in form, or at least humanized (viz. Classic myths of Arachne, Myrmidons and others). Deification may follow wherein the insect is truly changed into a symbol and ultimately its meaning may be transformed completely into an idea or even just a syllabic sound.

In its historical establishment the image itself frequently suffers considerable evolution or abstraction. Early depictions of the insect may bear close resemblance to the actual anatomy of the animal, even in detail. But time and usage gradually simplify the original form, sometimes drastically, until it is no longer recognizable. This occurs most severely when the image takes a place in the written language, because of the necessity of making it easy to reproduce. This is exemplified in the changes adopting the Sumerian sign for insect to the Akkadian (Assyro-Babylonian) cuneiform phoneme "uh."



A similar process has taken place in the old Chinese and Japanese ideographic writing style, but here the signs evolved retain their meanings for the original object. This is *signification* only, and probably represents a stage in the evolution of true *symbolism* in which final modification of meaning is implicit.

It is logical that the changes attending developmental metamorphosis led unrelated cultures to a parallel adoption of winged adult insects as symbols of the soul. The quiescent and mummy-like pupa would appear to represent the death of the earthbound larva, while the drastic transfiguration to a resplendent, flying adult, surely signals a miraculous resurrection. Perhaps this also explains why angels have wings.

The distribution of insect symbols is uneven through the world's history. Curiously, they are best developed in the most advanced, ancient civilizations of Egypt, Greece and Mexico. They are most abundant in the last, perhaps because the Mayan, Aztecs and other peoples of tropical Mexico were closer to nature, living in an area richer in life forms than the shores of the Mediterranean. The form appearing most often is the honey bee, followed by butterflies, flies, scorpions and centipedes.

Petroglyphs

The significance of early petroglyphic symbols is largely obscure. Many were probably totemic designs, but some may have communicated ideas and represented simplistic forms of pictographic writing. Insects were probably among the first category.

Source. — Mallery, C. 1972. (Dover reprint edition). Picture writing of the American Indians. Vol. II, pp. 87-88. Facsimile of a portion of stone found at Pipestone Quarry, Minnesota.

Representation of insect symbols, after various sources, by Museum staff illustrators Mary Butler and Joe Nakanishi.

General References

Enciso, J. 1953. Design motifs of ancient Mexico. Dover, New York.

Brodrick, A. H. ed. 1972. Animals in archaeology. Praeger Publishers, New York.

Butterfly Gods

The butterfly plays a widespread and significant role in both Aztec and Mayan mythologies and calendars. The sixteenth day in the twenty day-months of both cultures is ruled by deities with associated insect regents. The Aztec day in Cozcaquauhtli, "the king vulture," whose agent is Itzpapalotl. The Maya looked upon butterflies also as the spirits of dead warriors in disguise descending to earth. A Mixtec glyph in the form of a butterfly is known, possibly signifying a place or personal name or rank title.

Sources. — Seler, E. 1961. Gesammelte Abhandlungen zur Amerikanischen Sprach — und Altertumskunde. Vol. 4, pp. 713-728. Thompson, J. E. S. 1960. Maya hieroglyphic writing. U. Okla. Press, Norman. pp. 84-85.

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Egyptian Hieroglyphs

From the habits and structures of the scarab beetle, the people of Egypt evolved a wonderful symbolism: the beetle personified the sun because of the sharp, radiating projections on the head; the six five-segmented tarsi, totalled thirty, the same as the number of days of the Egyptian month; the ball rolled by the females represented the earth.

Likewise, the bee was an insect of veneration to the Egyptians because of its industriousness and importance in providing useful products, especially honey, the elixir of great power.

The profound symbolic importance of both these insects explains their incorporation into the hieroglyphic system of writing.

Source. — Lange, K. and M. Hirmer. 1961. (3rd ed.). Egypt. Architecture, sculpture, painting, in three thousand years. Phaidon Press, London. Figure 96. Facsimile from the upper portion of a pillar from a building of Sesostris I, Karnak (Cairo Museum).

Mayan Hieroglyph

The lower portion of the figure is a place-sign, designating "hill of the insect" (or "fly"), a locality near Acatepec, southern Mexico and probably important in Mixtec geography and history.

Source. — Smith, M. E. 1973. Picture writing from ancient southern Mexico. Mixtec place signs and maps. U. Oklahoma Press, Norman. Pp. 69-70, fig. 52. Facsimile from Codex Selden, 7-III, 8-I.

Scorpio

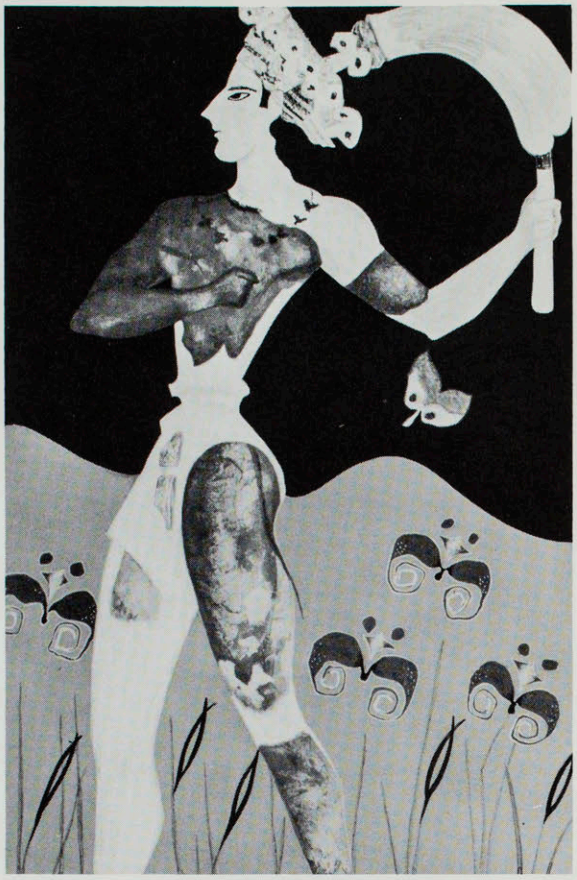
From earliest times star groups (asterisms) have received names symbolizing religious or mythological beliefs. Twelve of these in the zone of the heavens lying in the path of the sun, moon and principal planets, are known as zodiacal and are of special astrological significance. Although the constellation names and myths are not primarily of Greek origin (probably stemming primarily from Semitic or even pre-Semitic cultures), the eighth sign, Scorpio (The Scorpion), seems to be derived from a Greek myth concerning the god Orion. Having boasted to Diana and Latona that he would kill every animal on earth, Orion was set upon by a scorpion, sent by these goddesses, and stung to death. Jupiter raised the scorpion to heaven, and afterwards, at Diana's request, did the same for Orion.

Source. — Encyclopedia Britannica, Fourteenth edition.

Psyche (Cover illustration)

To the ancient Greeks, the butterfly symbolized the soul for which the word *psyche* was used. The origin of the symbolism is obscure, but one logical theory derives it from the sequence of forms in a butterfly's metamorphosis: the caterpillar is life, the pupa death, while the adult represents the winged resurrection of the spiritual being which has achieved its finest and most beautiful state. The Greek myth of Psyche and Eros is an allegory of the human soul and its purification and preparation for happiness by suffering.

Source. — Bodenheimer, F. S. 1928. Materialien der Geschichte der Entomologie bis Linne. Junk, Berlin. Vol. I, pp. 49-50 (fig. 22).



Egyptian Scarab God

The Egyptians did not consider their deities abstract or distant beings but believed that they had the same weaknesses and strengths of all living things. They were often depicted as humans or animals, sometimes a mixture of both. Such was Khepri (or Khepera), the god of transformations, which life, forever renewing itself, represents. His name signifies "scarab" and, at the same time, "he who becomes," and his image took the form of a scarab-faced man or as a man whose body is surmounted by this insect.

Source. — Lange, K. and M. Hirmer. 1961. (3rd ed.). Egypt. Architecture, sculpture, painting, in three thousand years. Phaidon Press, London. Figure 246. Facsimile of a portion of painted wall mural from the entrance room to the tomb of Queen Neferatari at Thebes.

Chinese Tongue Amulet

During the Han Dynasty (206 B.C.-A.D. 220) of ancient China, amulets were placed on the apertures of the body of the recently deceased, preventing the entrance of evil spirits before burial. That placed in the mouth usually bore the shape of a cicada, a symbol to these people of longevity and resurrection.

The cicada is also represented among the pictographs on the Oracle Bones from the Shang Dynasty (1776-1122 B.C.), probably also an emblem of long life.

Source. — Huggins, M. I. 1948. Cicada, tortoise, dove, hare, deer and crane in Chinese symbolism. Nature Magazine. Vol. 41, pp. 93-94.

Haida Arm Tattoo

Arm tattoos were common among the Haida Indians of the Pacific Northwest. Emblems were often only decorative, but many were of totemic significance or of mythical figures, such as the dragonfly ("mamathlona").

Source. — Mallery, C. 1972. (Dover reprint edition). Picture writing of the American Indians. Vol. II, pp. 396-398.

Sacred Honeybee

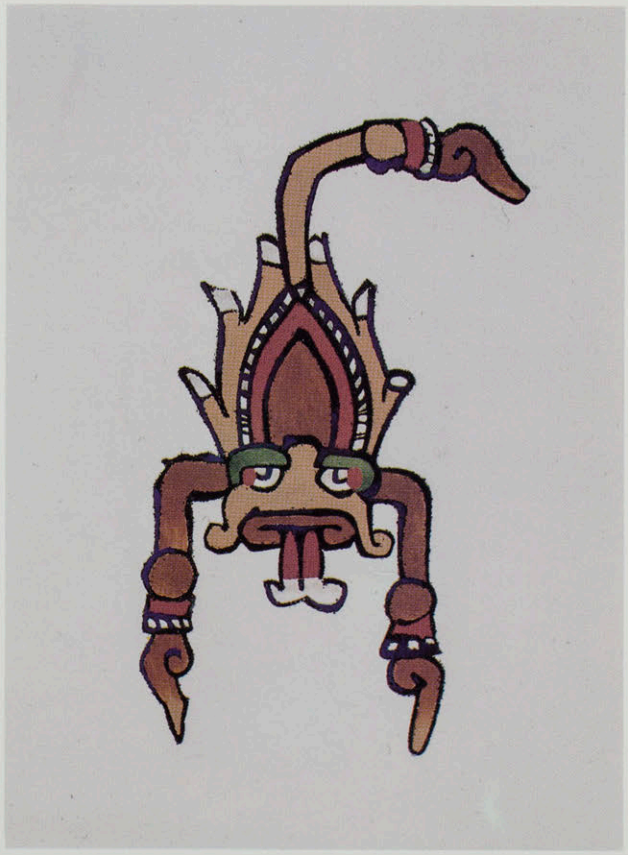
Ephesus and Ionia were the centers of worship of Artemis, the virgin huntress and goddess of wild nature, of whom the bee and stag were cult symbols and were the usual types of coinage designs. The high priest of the temple was called the "king bee' — the Greeks apparently were unaware that it should have been "queen" — and the priestesses, "honeybees."

The Artemis of Ephesus, a multibreasted fertility goddess, is distinct from the primitive agricultural goddess of Greek Arcadia. Effigies of the former bore symbols of the honeybee.

Source. —Fagerlie, J. 1964. Natural History. Vol. 73, p. 93. Facsimile of a Greek coin of Ephesus.

Scorpion Glyph

Similar to Egyptian hieroglyphs, the pictographic method of communication among the Mayas of ancient Mexico sometimes incorporated insect symbols. The significance of the scorpion image, variously portrayed, is not clearly understood. In some cases it is associated with the fire god. Considerable evidence suggests that it personified the god of hunting (often shown attacking a deer) who ruled the seventh day (Manik, Moxic, Che, etc.) of the basic series of twenty in the Mayan calendar.



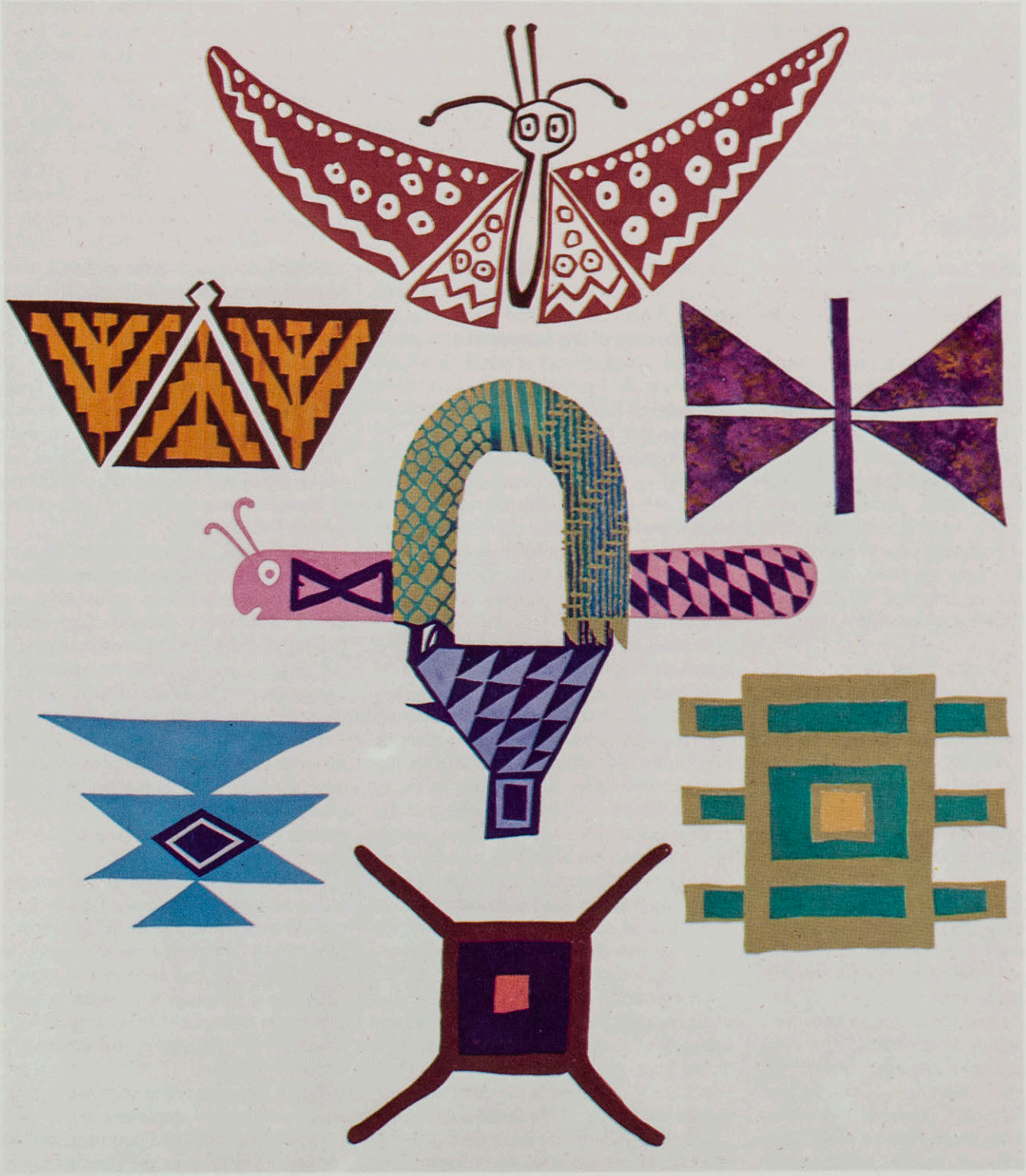
American Indian Insect Symbols

The Blackfoot believe that dreams are brought in sleep by the butterfly *(ap-u-nni)* and to the Navajos this insect symbolizes temptation and foolishness.

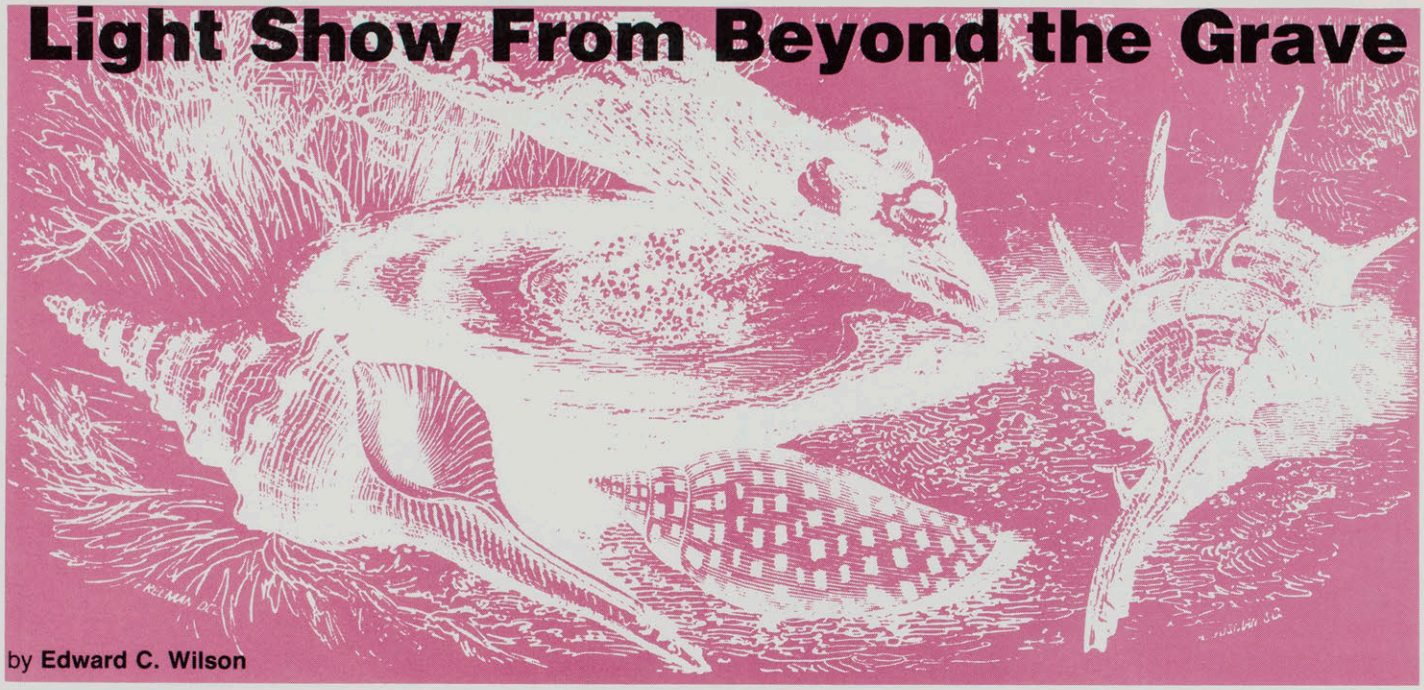
Patterns used for butterflies and other insects are common and vary considerably among tribes. Often they represent principal figures in tribal myths (Navajo-"cornbeetle") or deities important to survival (Navajo-dragonfly, symbol and indicator of pure water).

Source. — Clausen, L. W. 1954. Insect fact and folklore. Macmillan Co., New York. P. 28. Wymen, L. C. and F. L. Bailey, 1964. Navajo Indian Ethnoentomology. Univ. New Mexico, Pubs. Anthro. 12.

Dr. Charles L. Hogue is Senior Curator of Entomology at the Natural History Museum. This article stems from his long-time interest in graphic representation of the insect form as well as the part insects have played in man's history and culture.



Light Show From Beyond the Grave



by **Edward C. Wilson**

Under ultraviolet light, chalky white fossil seashells from Florida reveal fluorescent colors that are remains of former color patterns.

Nowhere is beauty more parsimonious with its kisses than in the fossil record. Once glorious seashells that might have made colorful showpieces for a collector's cabinet generally become uniformly pallid and aesthetically drear, although not without appeal as curiosities, within a few tens of thousands of years or so after death and burial. Fossil seashells usually excite only paleontologists who see them as clues in their quest for the origin of life and of its subsequent three and half billion year history on Earth.

For example, the most famous fossil seashells in Los Angeles County are found in the loose sand of raised beaches on the Palos Verdes Peninsula. These seashells are about a hundred thousand years old and are chiefly chalky white, although a few show pale color traces. Twelve hundred Museum Alliance members may recall their 1969 Dimensions to Delight "dig" for these fossils.

Another famous fossil seashell locality in Los Angeles County is near the crest of the Santa Monica Mountains along Old Topanga Canyon Road. It is about twenty million years older than the Palos Verdes Peninsula one and has changed from once loose sand into hard sandstone enclosing entirely drab fossil seashells.

In the Marble Mountains of nearby San Bernardino County, some of the oldest known fossil seashells may be seen. They lived and died more than half a billion years ago in a world as yet without fish, amphibians, reptiles, birds, mammals, or land plants. These little fossil seashells are without traces of any colors but exceptionally rare specimens of a similar kind and antiquity found elsewhere in the world have dull patterns that prove seashells had colors even this long ago.

Major museums — among which ours is included — maintain large collections of such fossil seashells and the myriad other kinds of invertebrates for current and future research and as voucher specimens from past studies. Some specimens are used for displays, museum classes, and popular articles like this one.

Studies of the color pigments in living seashells reveal that they are complex organic substances built into the limey shell by the living animal. Melanins and tetrapyrroles are reportedly two common pigments. The former are said to be relatively insoluble, but the latter are soluble in many liquids. We have observed above that the color pigments in seashells are unstable over long periods of time. It seems likely that the waters percolating through the sediments burying the dead seashells dissolve and disperse some of the color pigments. Perhaps other agents as well are responsible for their disappearance.

Until recently, only the rarest specimens of fossil seashells were known to have even traces of original color patterns, except for those from the very youngest fossil deposits such as the Palos Verdes Peninsula raised beaches. This article is about specimens very much older recently discovered to have beautifully common and commonly beautiful color patterns, when seen in the proper kind of light.

That kind of light is ultraviolet light. It seems unnecessary to go here into the physics of this phenomenon, and so I simply point out that this is the same kind of light called "black" light used for advertising, parties, and elsewhere to make fluorescent objects glow. "Black" lights and strobe lights were necessary components of the light shows that until recently accompanied rock concerts.

These fossil seashells are found in deposits at several places in southern Florida. The ones figured here came from spoil banks bordering a canal in Okeechobee County and are ten to fifteen million years old, or somewhat younger than the Old Topanga Canyon Road specimens, but much older than the ones from the Palos Verdes Peninsula raised beaches, which they nevertheless resemble in preservation. In ordinary light, they are seen to be well-preserved and mostly chalky white, although a few show very pale brown color patterns.

Their "secret" character is not possessed by the Los Angeles County fossils or, to the same degree as far as I know, by other fossil seashells from elsewhere. We have tested all the ones in our museum collections, which is worldwide in scope, although obviously incomplete. What causes this geographic restriction is unknown at present.

When exposed to the short wave kind of ultraviolet light in darkness, some of the fossil Florida seashells fluoresce brilliantly with symmetrical orange patterns against a

glowing violet background. These are the original patterns occupied by the colors of the shells while alive, although the colors themselves are no longer present. Since color patterns on living seashells are useful characters for biologists who classify them, their preservation on fossil ones gives delighted paleontologists another character with which to compare the fossil with the living seashells and to distinguish among the various kinds of fossils.

Many of the Florida fossil seashells fluoresce only on parts of the shell that were exposed to sunlight while they lay partly reburied on the canal spoil banks. Some that fluoresce only slightly or not at all will do so brilliantly after being soaked in ordinary household bleach for one or more days. Many will not fluoresce even after exposure to sunlight or treatment with bleach. Living seashells will not fluoresce at all. The reasons for the fluorescence and its differential distribution in Florida fossil seashells have not been reported.

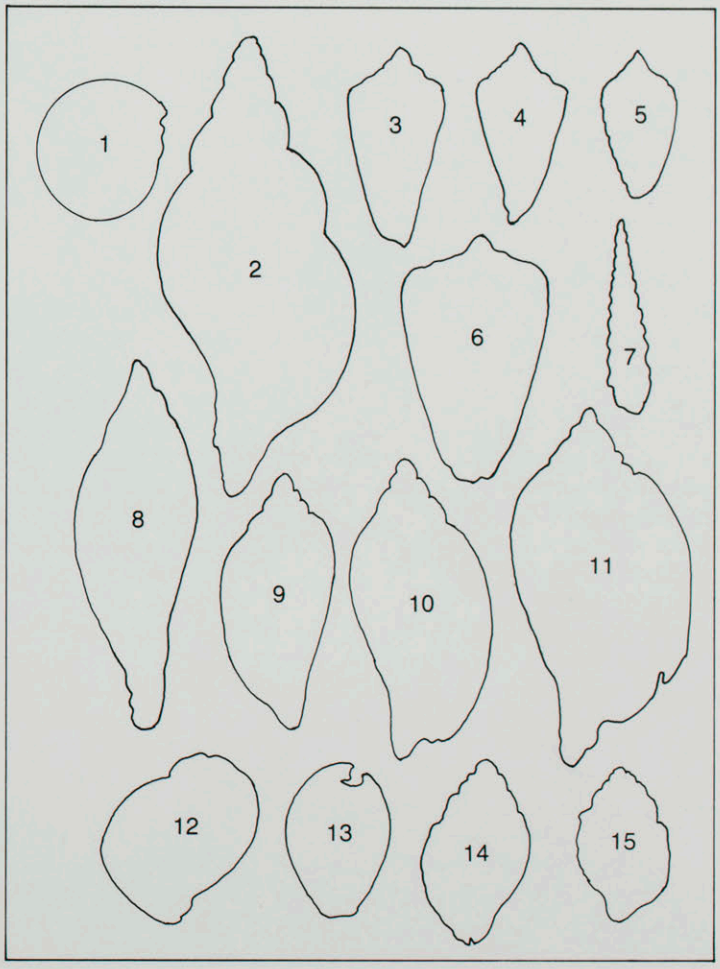
Color patterns appear only on the outsides of living seashells and the specimens figured for this article are snails from the Florida deposits chosen because they are the most beautifully patterned. We also have observed that the main one or two muscle scars inside clams and an associated feature called the pallial line may fluoresce well. This makes it possible to see these features and some small accessory muscle scars that otherwise might not be easily visible on fossils.

Although the color pattern fluorescence is more pronounced in specimens from southern Florida than from any other fossil locality reported, the muscle scars and pallial lines of fossil clams from many localities in our collections, including the Palos Verdes Peninsula raised beaches, may fluoresce readily. This is a new research tool and has assisted us already in locating tiny accessory muscle scars on some fossil scallop shells that establish them as having been swimmers.

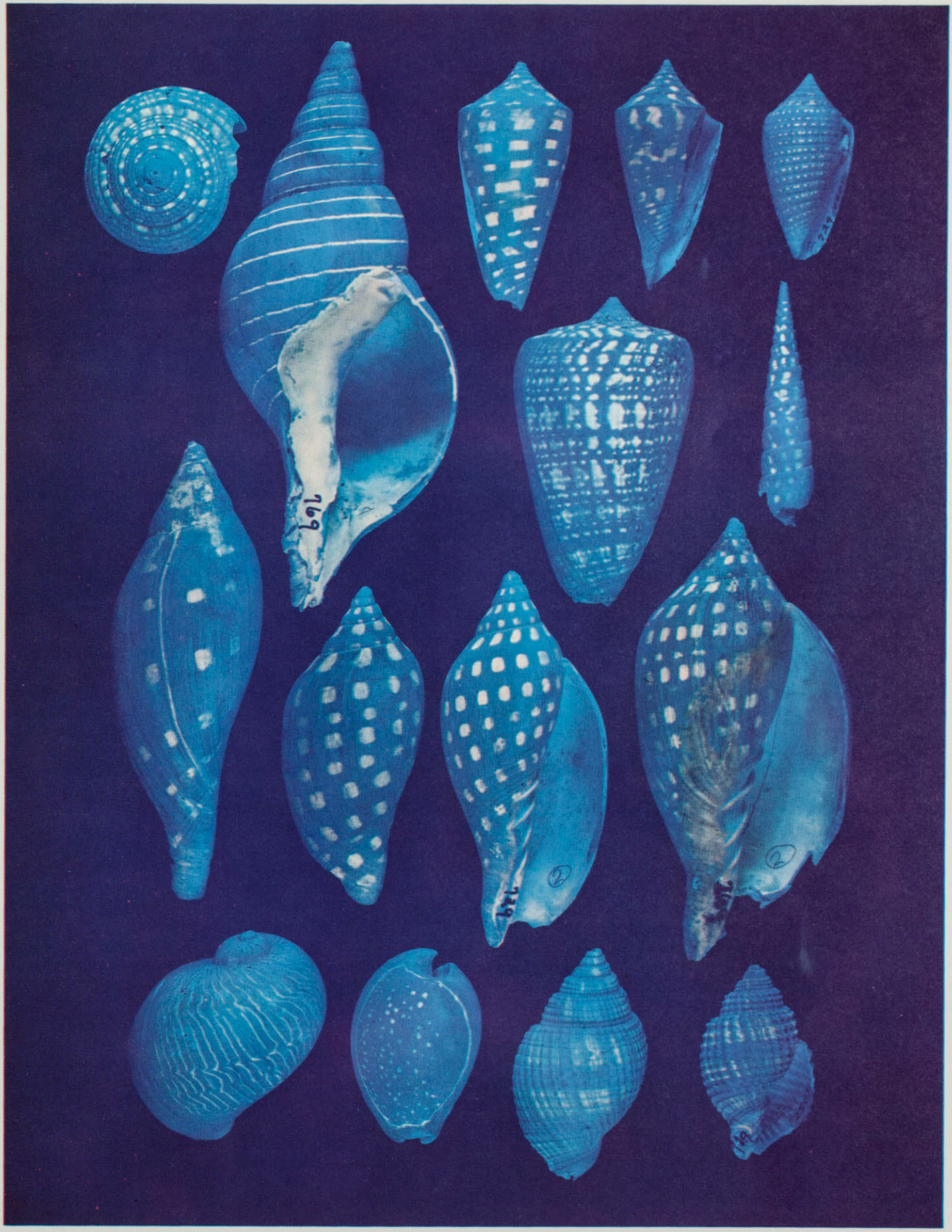
Our museum is the first to have a permanent display of Florida fluorescent fossil seashells. They are in a special case in the Invertebrate Fossil Exhibits. Many of these specimens are gifts or exchanges from Jean and Crawford Cate of Brentwood, Shirley and Bob Hoerle of West Palm Beach, and Emily and Harold Vokes of New Orleans. Thomas Warren of Ultra-Violet Products, Inc. in San Gabriel kindly loaned a short wave ultraviolet lamp and other equipment used to select specimens for this article and our exhibit. We thank them and other unnamed friends for their generous assistance and look forward to the appearance of some serious research which they may be encouraging or preparing about the origins of this mysterious fossil light show that bears the spectral kiss of beauty.

Perseverance brought TERRA this unusual article by Edward C. Wilson, curator of Invertebrate Paleontology at the Natural History Museum of Los Angeles County. The shells have never been published in fluorescent color before and it took a year to bring them, special photographic equipment, and Photographer Reynolds together.

This schematic is the key which identifies the shells on pages 12 and 13, which are a few of the fossil seashells ten to fifteen million years old from Okeechobee County, Florida in the collections of the Natural History Museum of Los Angeles County. All specimens are approximately natural size in the photographs. The specimens on page 13 were photographed under short wave ultraviolet light by Lawrence S. Reynolds with an 8 by 10 inch view camera, 360 mm f 5.6 Symnar lens, Kodak Wratten 2E ultraviolet and CC 30 red filters, Ektachrome professional daylight sheet film, against a background of black plexiglass. Exposure: 12 hours at f32.
On page 12 the same specimens were photographed under ordinary light by Mr. Reynolds.



1. *Architectonica nobilis* Röding, 1798
2. *Fasciolaria rhomboidea* (?) Rogers, 1839
3. *Conus* n. sp.
4. *Conus* n. sp.
5. *Conus waccamawensis* Smith, 1930
6. *Conus* n. sp.
7. *Terebra unilineata* (Conrad, 1841)
8. *Aurinia obtusa* (Emmons, 1858)
9-11 *Scaphella trenholmii* (Tuomey and Holmes, 1856)
12. *Natica plicatella* Conrad, 1863
13. *Siphocypraea carolinensis* (Conrad, 1841)
14-15 *Cancellaria rotunda floridana* Olsson and Petit, 1968



WHEN ALL OF CALIFORNIA WAS A SUPERMARKET . . . AND FOOD WAS FREE FOR THE TAKING

by **Elizabeth J. Wright**

In cooperation with:

Deborah Medina *who did the research as a member of the Museum's Natural Science Workshop, during her tenth-grade year in high school.*

and

Amy Goldmintz, *who made the drawings after her training in the Scientific Illustration class in the Natural Science Workshop.*

Food — that basic survival item necessary to sustain human life. Every group, tribe, nation of people has developed its own answers to the ever-challenging question: what shall we eat?

Most Californians of today find the answer in supermarkets — super in size, in selection as well as in price. But for the early California Indians food was free for the taking.

Granted convenience was not the key-

note then. Today's twentieth century housewife, geared to convenience-packaged, sugar-saturated, vitamin-charged, puffed-popped breakfast cereals, could easily develop a top-flight neurosis if faced with the prospect of preparing the most important source of food for all coastal Indians of 6,000 to 10,000 years ago. The plentiful little acorn was jam-packed with nutritional value. Research reveals that the acorn meal before cooking contains 21.3 percent fat; 5.1 percent protein; 62.2 percent carbohydrate, with the remainder consisting of water, ash and fiber. The trick was to extract and make edible this nutrition. Most modern California school children can glibly recite the process: the nuts were hulled and ground in a mortar, then the meal of flour poured into a leaf-lined hole in the sand or into a basket; hot water was poured over it several times to dissolve the poisonous tannic acid and the final result — a mush or little flat cakes.

A far more complicated process became necessary for the preparation of acorns from the American Live Oak, *Quercus virginiana.* The Indian housewife, or wickiup wife, spent a week leaching these stubborn little nuts. At the end of this time, and after proper cooking, the nut meal became transformed into a porridge which jelled like custard and when well-cooked took on the tempting color of chocolate pie. Depending upon the whim of the cook the family would be presented with chocolate-colored jellied squares as a side dish with deer meat or simply eaten as a tasty dessert.

As to contemporary food selection the modern meal-planner is at the mercy of corporate farming. Thus most flours are confined to crop products made from wheat, barley, rye, rice and oats. But consider the varied plant sources for flours used by California Indians. The iodine bush, *Allenrolfea occidentalis,* found in moist alkaline soils of the desert, yielded small black seeds which were ground and the meal moistened, then shaped into cakes. California Brome, *Bromus carinatus,* a rough hairy grass known as poverty grass by the pioneers, provided a heavy seed which the Indians parched then ground. During the rare period of acorn shortage, nuts of the California Buckeye, *Aesculus californica,* were called into play. However, considerable pretreatment was necessary to eliminate a poisonous alkaloid content. The mention of so exotic an item as "California Buttercup Flour" could well cause a case of oneupmanship to develop in the most genteel of gourmet circles. Yet Indian women gathered the seeds of this *Ranunculus californicus,* then winnowed, dried, parched, ground and used them quite as a matter of course.

A modern California hiker rambling about in the foothills is apt to sight evergreen shrubs six to ten feet high with simple, serrated leaves terminated by white flowers in small clusters. The Indians, ever utilitarian, prized these Toyon Berry Bushes, *Heteromeles arbutifolia,* for their berry yield. Baked in earthen ovens with hot stones for two to three days, the berries were ground and another variety of meal resulted. For a tasty topping to spruce up the common acorn mush, the seeds of Clarkia, *Clarkia elegans,* underwent the drying, parching and grinding-on-mortar process. For the Indian epicure with a penchant for bitter bread, seeds of *Ephedra californica* (also known as Joint Fir) and *Ephedra nevadensis* provided the makings.

"Please Don't Eat the Daisies," warned Jean Kerr in a onetime best seller. Since early California Indians had no such ethnocentric warnings, these native people enjoyed without guilt mush made from prepared seeds of Gold Fields, *Baeria chrysostoma,* a small open grass-land annual which closely resembles a daisy.

Today's housewife may think of the Manzanita, *Arctostaphylos* sp., as a gift shop item metamorphized from innocent twigs into strange anthropomorphic creatures, offsprings of the overwrought creativity of self-professed craftsmen. The Indians, ever pragmatic, ground the berries of this plant and used the meal for food.

Mariposa Lilies, *Calochortus* sp., furnished further variation. The dried bulbs when pounded resulted in a meal used for mush or gruel.

Wickiup wives, who found themselves in desert canyons during July and August, could avail themselves of another flour producer: the beans of the Palo Verde, *Cercidium floridum.* In the late summer seeds of the Pigweed, *Amaranthus fimbriatus,* added yet another selection.

When a female member of today's affluent society gathers pinon cones while vacationing in a desert mountain area she usually has in mind the creating of that

ever-popular home art object — the Christmas wreath. In times past the Indian ms. (with no regard for artistic potential) tossed the cones into a fire to loosen the nuts and seeds which would then be subjected to the endless matate movement. Way back B.G. (before Gerber) clever Indian mothers nourished infants with a soup made from the pine nuts.

Is it possible that so-called civilized folk have been deprived of two good sources of meal, which were used by the Indians, simply because of semantic unattractiveness? A pound package labeled St. John's Wort Flour or Sea Blite Meal could well repel the fastidious modern. The Indians had no such semantic hurdle to overcome when utilizing these excellent sources of nutrition.

'Wild Oats' carries various connotations today, but in earlier times the rough, sharply-pointed seeds of the wild oat, *Avena* sp., were a no-nonsense consideration. Thrown together with hot coals, shaken in a basket and then stone mortared, wild oats made good eating.

Let the followers of Julia Child and readers of Epicure Magazine take heed — go into *any* gourmet market, ask for a pound package of Cattail Pollen Flour and see how far you get. But the Indians had it and used it in making a type of bread.

For high protein buffs, a listing of the birds and game consumed by California Indians can be fascinating food for thought . . . especially in view of today's prices. To the Chumash Indian the most important animal was deer, though hunting was secondary in importance to fishing on the Channel. Rabbits and rodents were vital to the Chumash diet and, figured in pounds, were probably used as much as deer. These people fastidiously avoided scavenger type birds as food but munched eagerly on quail, eagle, hawk, dove, duck, geese, crane and mudhen. In addition to fish, the sea yielded such delicacies as octopus tentacles and barnacles, while turtles were especially prized.

The Miwok considered deer their most important meat with rabbit a close second. Other creatures rated as lip-smacking included elk, antelope, beaver, squirrel, rats, snakes, lizards and frogs.

The mainstay of today's veterinarian, the dog, was found to be somewhat toothsome by the Yokuts, but among Northern Californians the dog was regarded as deadly poison. The Southern Yokuts considered skunk a delicacy which, when smoked to death in its hole, lost its offensive odor. The Miwok and Salinans wanted absolutely nothing to do with it.

Seeds from the chia plant were parched and mixed with ground wheat to produce a nutty flavor.

Canalino Indians, in addition to the ever-plentiful deer, goose, duck and quail, feasted on coyote, bear, whale, sea lion, seal and swordfish.

And now for the beverages. Sorry, no Kool-Aid . . . but anyone for Manzanita Cider? Made from *Arctostaphylos manzanita* it was considered delicious. The Barberry, *Berberis,* which boasts thirteen recognized species, contributed seven to Indian use. The fruits were utilized to make a pleasantly acid libation. Wilted or dry leaves of Cow Clover, *Trifolium involucratum,* when soaked and stirred in a basket of cold water for ten minutes resulted in a sourish drink. The Lemonade Berry, *Rhus integrifolia,* a favorite, carries its own beverage identification description. A sweet lemony-tasting drink resulted from pouring water over the seeds of the Mesquite *Prosopsis.* The sophisticated hostess of today can offer a concoction known as a Screwdriver. The Indian hostess could have offered the Screwbean, a drink made from ground pods and seeds of *Prosopis pubescens.*

When considering tea it is highly unlikely that the British ritual of 'foursies' found a counterpart in the lives of California Indians. However, several native plants yielded teas of exotic character. Lupine, *Lupinus* sp., is reported to have been a favorite, its seeds furnishing the base for an aromatic sipping experience. Squaw tea, made from the *Ephedra* plant enjoyed popularity with Indians, Mexicans and Spanish settlers who steeped the stems, either green or dried, in boiling water. The Bearberry plant, *Arctostapylos uva-ursi,* when boiled made a tasty brew while the leaves alone were frequently used in smoking tobacco. Had they been looking for a coffee substitute the Indians could have settled for their pungent hot pickup made from singed seed coats of barley.

In considering fermented native drinks it is possible that A.A. would have found few recruits. Yet the Juniper Berry, *Juniperus californica,* brought delight to the parched palates of California Indians. Wine from the fruit of the Elderberry, *Sambucus* sp., has persisted to this day in spite of a temporary setback occasioned by the warped altruism of two elderly ladies of "Arsenic and Old Lace" fame.

The fact that Agave wine (or pulque) is rich in carbohydrates as well as Vitamins B and C would be a handy rationalization for the modern imbiber. An inhibiting factor, however, in tune with today's suspicion of plant hypersensitivity, is the fact that an *Agave,* after producing up to seven quarts a day for six months, dies of exhaustion. On

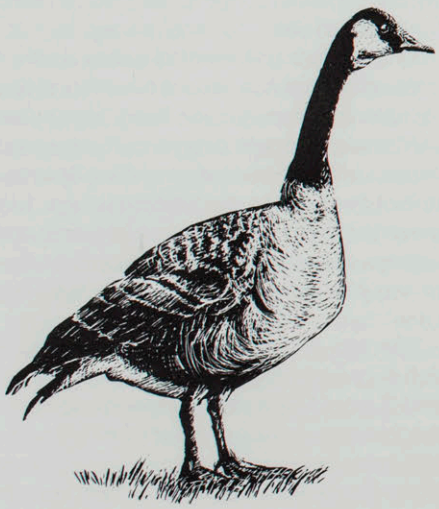
the plus side is the fact that the fermented juice keeps well and is a safe source of liquid in areas where liquids are scarce.

It is true that today's housewife suffers little seasonal inconvenience in terms of food scarcity. It was different with the Indian women of California who had to observe certain dictates of the seasons. Seeds, though available in spring, were mainly obtained during summer and autumn. The plentiful bulbs, roots and tubers offered sustenance in spring and summer. Greens (stems and leaves) were usually picked when young which meant springtime. The harvesting of fruits occurred during summer and autumn while a few species could be gathered in winter. Autumn signaled the maturing of the ever-popular nuts. Fortunately the pine nuts matured in late summer and extended into fall.

While effort was required of California Indians to sustain themselves, the picture differs from other cultures in which peoples starved, froze, and battled nature in order to survive. In fact, the natural wild plentitude available to early California Indians seems to have aroused a puritanical hostility in historian Hubert Howe Bancroft who, in writing of them, asserts:

> Californians . . . comparatively speaking, wear no clothes, they build no houses, do not cultivate the soil, they have no boats, do not hunt to any considerable extent; they have no morals nor any religion worth calling such.

Obviously vexed, he further describes them as "sunk to the level of utter darkness of the brute beast."



The west coast flyway provided a rich and varied diet of birds for the Indians.

Today the question can be asked, why should native peoples have labored with the plow and hoe? Abundant comestibles were there for the taking: — manzanita berries, elderberries, wild currants, gooseberries, wild black and Holly Leaf Cherries, California Hollyberries, wild grapes, raspberries, Squawbush and Lemonade Berries — to say nothing of free bulbs, including the popular blue-flowered Camass, roots, greens, fruits, fish and game — all amply provided by Nature.

It is highly probable that many a modern California family whose grocery bill is spiraling will differ with Bancroft and cast envious glances back over the years to the time when all of California was a supermarket and food was free for the taking.

In the event the reader is overcome with desire to prepare an early, exotic delicacy, the following unexpurgated recipes are presented:

Bear Tongue

Cover tongue with cold water, add salt and bring to boil. Skim off scum. Simmer until tender. Let cool in liquid until it can be handled. Skin and remove small bones at the base. Serve hot or cold.

Broiled Dried Fish

Coat dried fish with acorn mush. Fasten firmly to forked green sticks and broil over fire. Cook until coating is well-browned.

Caterpillars

Caterpillars were eaten by the Gabrielinos. They were toasted until crisp and then served.

River Mussels

Poke mussels into sand with only tips showing. Cover with grass and twigs and set fire to the covering. When fire has died rake away and eat small tidbits.

Sea Lion or Seal Steak

Cut meat into slices which can be handled easily, fasten firmly on sturdy forked green sticks and hold over coals of a wood fire until browned.

Juniper Berry Wine

Grind fresh berries, cover with water and allow mixture to settle and ferment. (Roughly two weeks). Strain liquid and store until ready to use.

Clams

Build a fire in an earthen pit about 2 feet deep and cover with a layer of stones, allowing space for fire to continue burning. Arrange clams on the stones and cover with oak leaves. If a large quantity is to be cooked, continue to alternate layers of clams and leaves.

Common Camass Bulbs

The edible, blue-flowered Camass Bulb is often confused with the Death Camass, which has white to cream-colored flowers and is true to its name. After careful identification the blue-flowered Common Camass can be eaten raw or baked in a pit beneath several layers of pine needles. Bake the bulbs for a day and a half.

Grasshoppers

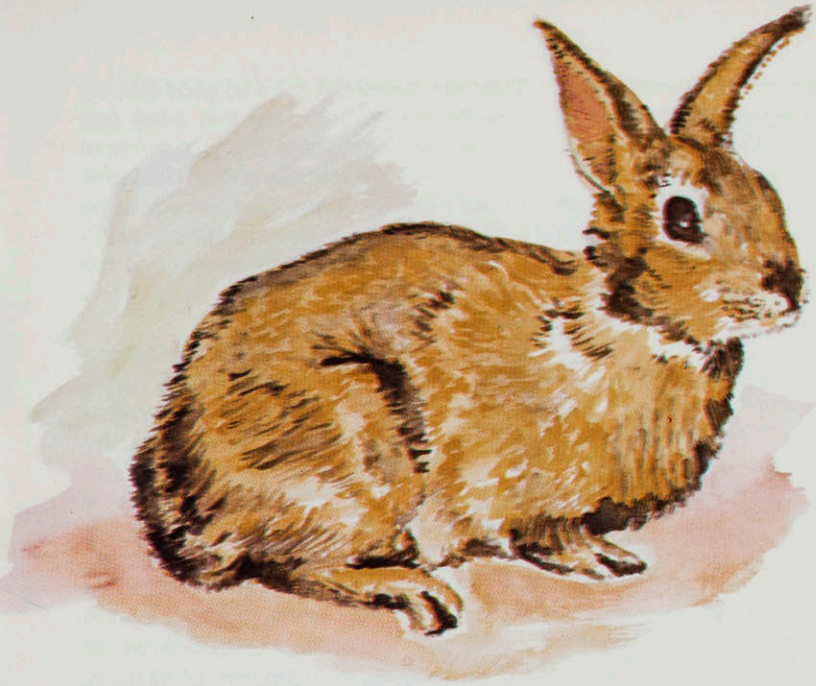
Corral grasshoppers into a large earthen pit. Cover pit with stones and build a fire over the stones. Bake. Remove grasshoppers from pit. These insects can be served as desserts or snacks.

–Bon appetit!

Elizabeth Wright is a versatile author who writes for radio and TV, as well as special material for comedians. Her TERRA article on the comic strip was recently reprinted in Air California.

Acorns from the California live oak were ground into a meal on a metate and the poisonous tannic acid removed with hot water before being eaten as a mush. Acorns were a most important food for coastal Indians.

Meat from the striped skunk and many other small mammals was cooked or dried for storage.

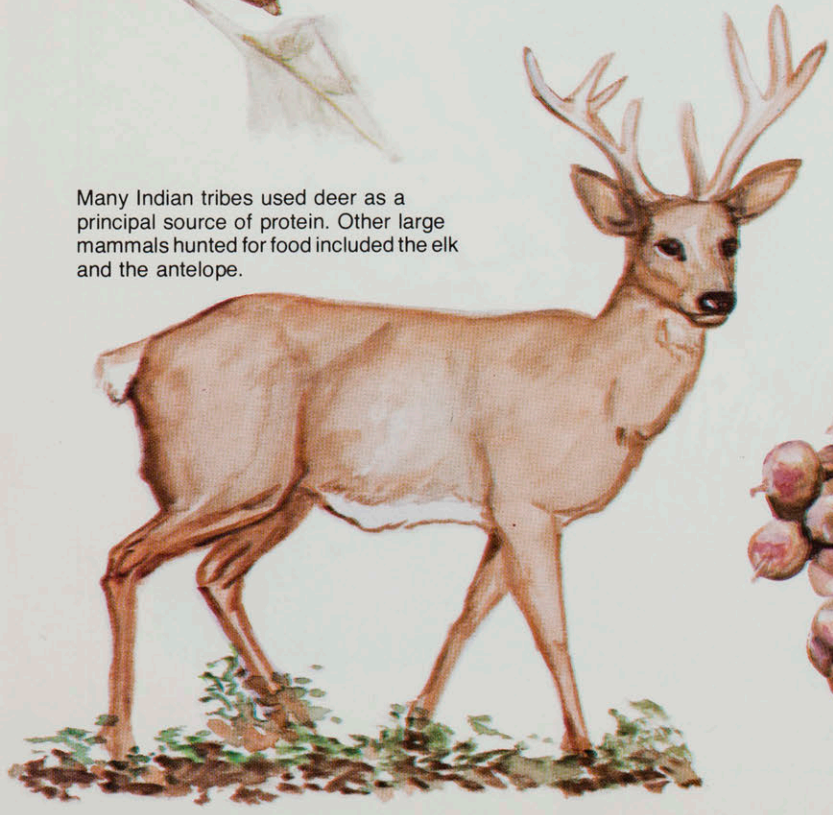


The prolific cottontail rabbit was an excellent food item for the Indians who also used the skin for ornaments and clothing.

California sea lion meat was often cut into small pieces, skewered and cooked over an open fire.

Fish were often coated with an acorn mush, skewered on a forked stick and cooked over an open fire.

Many Indian tribes used deer as a principal source of protein. Other large mammals hunted for food included the elk and the antelope.



Manzanita berries were eaten raw, cooked or ground into meal for a kind of porridge. Sometimes the berries were crushed and scalded to make a refreshing drink.

QUESTION: What is a tool?

TOOL: *1. An instrument of manual operations; an implement. 2. Anything which serves as a means to an end.*
(Definition adapted from Webster's New Collegiate Dictionary)

by **Gale Sphon**
Drawings by Mary Butler

For many years man was believed to be the only animal in the world to use a tool; in his own egotistical way, he has used this as one criterion for advanced intelligence. Slowly, the truth emerges. He's not alone in the use of implements. WE might expect some of the larger anthropoid apes to use some type of crude tool, as indeed, the chimpanzee does, but "competition" from an ant? Hardly! Nevertheless, it's true! In fact, there are several insects that are known to use tools. Several species of Thread-Waisted Wasps *(Ammophila)* are known to use a stone as a tamper. They stock their burrow with food, then fill the opening with sand. After this, they take a small stone or pebble and tamp down the sand.

The ant referred to above is known as the Tailor Ant *(Oecophylla)*. A group of adult Tailor Ants will pull two leaves together and another group, holding their own larvae in their mandibles, will touch the larva to one of the leaves, pull it away, and touch the other leaf. The silk from the larva strings out from where the leaf was touched and "sews" the two leaves together.

Even spiders get into the act. The Bolas Spider very carefully selects an area to build its web. Actually, it doesn't build the orb type of web that most of us are familiar with, but merely runs a few strands of silk across an insect fly-way. The spider then spins a ball of viscid silk which it suspends from a long strand. As various insects pass by, the spider slings the ball of viscid silk at them with amazing accuracy.

If one can consider a drop of water as a tool, then fish may be considered, too. There are five or six salt water species of Archer Fish found in Asia that can, and do, spit water drops at flies and other insects. Their aim is reputed to be so good that the insects can be up to ten feet away and moving. Actually, according to a series of experiments performed at the California Academy of Sciences in San Francisco, the Archer Fish is overrated as far as its accuracy is concerned. It's the mass of fire power that really does the job, not just one accurate shot.

The best known example of the use of a tool by an animal other than man is by the Sea Otter. This beautiful animal is loved by ALMOST everyone. About the only exception is the commercial abalone gatherer who claims the otter is destroying his livelihood by depleting the abalone beds.

The Sea Otter will pick up a large rock and detach an abalone or gather up a sea urchin and take both the rock and food to the surface. There, the otter fastens itself to the kelp canopy and rolls over on its back.

Sea Otter

Clams are good too!

Chimpanzee

Termites – yummy!

It places the rock on its chest, grips the food between its paws, and smashes it against the rock.

Not only is the Sea Otter like its fresh water cousin in that it is a true clown and loves to play, but it, too, was trapped and killed for its fur. So much so, that the species was believed to have become extinct. However, it was "rediscovered" a few years ago off the Monterey coast and while it still does not range over the area it once did, it has made a remarkable comeback.

A recent discovery that has not only been well-documented, but photographed and filmed for all to see is, truly, one of the classic pieces of behavioral research. This is Jane Goodall's work with the chimpanzees. Not only was this well-presented to the public in National Geographic Magazine, but was also shown on national television where it was viewed by millions of people.

One of the chimpanzee's major food sources are termites. In order to get to the insects the chimp takes a long straw or piece of dried grass, poking it down one of the openings in the termite nest. The termites will grab onto the probe which is then pulled out with the termites still hanging on. Miss Goodall reports that she has observed individual chimps sitting by a termite nest for as much as two hours while fishing for food. When the straw becomes bent or unsuitable for use, the chimp will either break off part of it or select a new probe. Sometimes a leafy twig is selected and the chimp must strip off the leaves before the "tool" can be used.

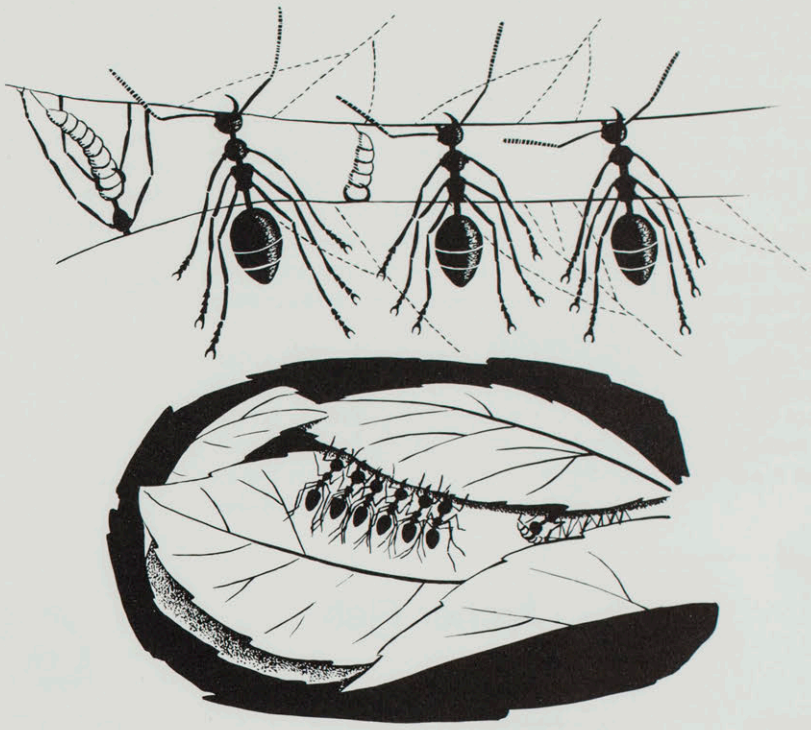
An even more recent discovery by Miss Goodall is the use of leaves as a sponge. If a chimpanzee can't get its lips to water to drink, it will take a bunch of leaves still attached to the stem and partially chew them. It will then dip the chewed leaves into the water, raise them, and suck the moisture from the leaves. The partial chewing of the leaves greatly increases the absorption of the leaves.

A small bird, one of a group endemic to the Galapagos Islands, that was partially responsible for Darwin's Theory of Evolution is the Galapagos Woodpecker Finch. It is doubtful, however, that Darwin himself ever observed this particular finch's behavorial patterns. The little bird will knock on the branches of trees and shrubs to locate grubs. It will then take a cactus spine or suitable twig and use it either as a probe or a lever to force the grub out of its hole. Sometimes it is necessary for the bird to make "alterations" in its tool so that it will work better. If a stick or twig has been

Bolas Spider

Fore!

Tailor Ants



This is the way we
sew our leaves . . .

Egyptian Vulture

One omelet coming up!

selected for use, the finch must sometimes break off projecting twigs with its beak. It has also been observed to bend its tool so that it will better fit the grub's burrow. When the probe has done its job and the grub is close enough for the finch to reach it with its beak, it drops the probe and grabs the grub. The Woodpecker Finch has also been known to retrieve the same probe and carry it on to the next plant for use in the same way.

The Egyptian Vulture is a large bird standing about two feet high. Its primary source of food is carrion. It has also been known to do damage to date crops and will eat ostrich eggs when it can find them. Ostrich eggs are probably the strongest of all bird eggs and the shell is about two millimeters thick. Thick enough to make it impossible for the vulture to break it with its beak.

Sometime, eons ago, the Egyptian Vulture learned that it could get at the contents of an ostrich egg by throwing some object at it and breaking it open. The vulture selects a fair-sized rock, takes it in its beak, and hurls it at the ostrich egg with quite a bit of force. Often the rock just bounces off the egg. When the vulture persists, however, and does finally accomplish its mission, the contents are available to it. Quite often there are several vultures at work on the same egg at the same time. When the egg is opened they all share it. Why not? With that much uncooked omelet there ought to be enough to go around.

Many authors consider the Sea Otter, Chimpanzee, Galapagos Woodpecker Finch and the Egyptian Vulture to be the only animals other than man to use a tool. But how much does this differ from the insects and spiders? The Thread-Waisted Wasps with their pebble tampers are surely as much of a "tool-user" as is the Sea Otter or Egyptian Vulture. After all, according to the definition quoted from Webster, "Anything that serves as a means to an end," is a tool.

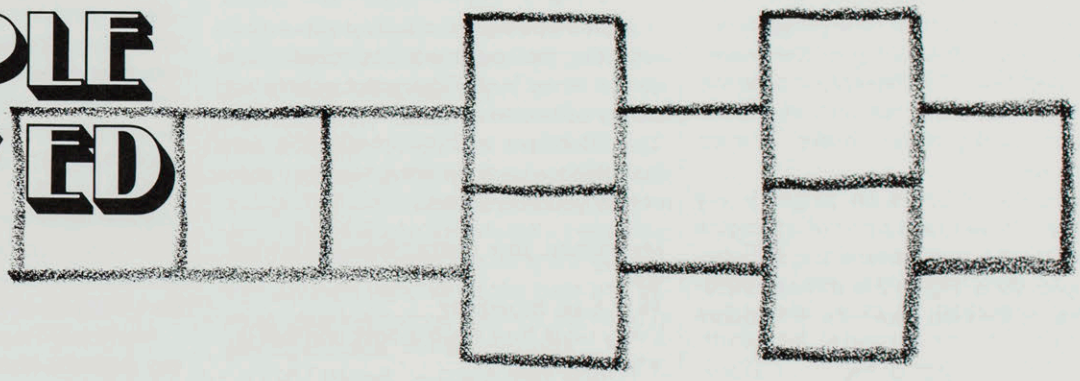
Gale Sphon is a curatorial assistant in Invertebrate Zoology at the Natural History Museum of Los Angeles County. This is his fourth TERRA article, and the subject matter again allowed him the whimsy which delighted readers of his "snail article".

Archer Fish

Sssptt!! – gottcha!

THE GAMES PEOPLE PLAYED

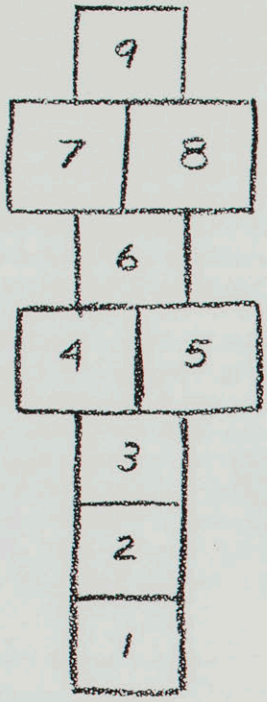
by **Robert E. Wade**



If you have recently seen a hopscotch pattern chalked on a sidewalk — you have seen a fossil from the lost world of "Special Street Games". Those games played on streets and playgrounds during and after school needed some special personal-equipment such as marbles, tops, hoops, balls, jacks, a lagger or potsies, jump ropes or jackknives. This eliminates running games like "Hide and Seek — "Tag" — "Blind Mans Buff' and "King on the Mountain". (But come to think of it, when was the last time you saw such?)

Hopscotch required unique devices to use as laggers or potsies. As a boy, I was lucky to have access to a large bench vise with which I could bend nails into intricate links to make special laggers that would catch and hold fast for fellow hopscotch aficionados. The standard hopscotch design pattern was like figure 1.

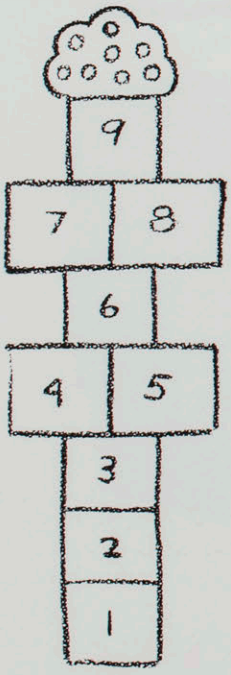
Fig. 1.



This has been verified by a dedicated research assistant, Ms. Judy Francis, the daughter of a former Museum Illustrator now living in Ojai, California, who did a summer of research on rural playgrounds and reports that hopscotch is now played by a "select few". A rather cryptic observation in the 1970's, what with plumbers, streakers, backgammon freaks, grunion hunters, etc.

In a couple of books on games in my collection, I have found a pair of hopscotch patterns that have very interesting sociological implications. Figure 2 is an early Victorian design, the blob above the #9 square

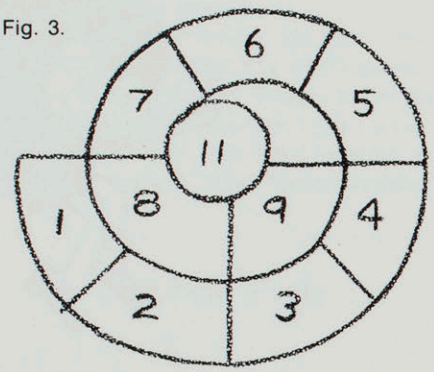
Fig. 2



represents a plum pudding which probably reflected the desire for the sweets or culinary pleasures of the Victorian working classes during the Industrial Revolution. "Hopescotch (sic.) was in vogue in 1766 at Eaton, but was strictly a 'boys' game'." It also may have been a device for exercise designed to teach them their "sums" at the same time.

Figure 3 is most unusual: a spiral hopscotch pattern popular in the 1930's. The spiral might have been an economic move dictated by limited space or lack of chalk.

Fig. 3.



Jump Rope was also a great street game reflecting the social and emotional moods of the times in the delightful chants and songs coined to maintain the rhythm. My Ojai informant has collected some local fast-disappearing versions. Here are some I hope you may recall:

My mother, your mother lives across the way,
1617 East Broadway
Every night they have a fight and this is what they say:
Ica bica, ica bica, ica bica boo
Ica bica, ica bica, out goes you!

Blue bells, cockle shells
Eby, ivy over.

Lady, lady turn around
Lady, lady touch the ground
Lady, lady shine your shoe
Lady, lady that will do!

Down by the ocean, down by the sea;
Johnny broke a milk bottle and blamed it on me.
I told Ma, Ma told Pa, Johnny got a lick'n,
So Ha! ha! ha!
How many lick'ns did Johnny get? 1, 2, 3, 4, and etc.

I love coffee, I love tea, I'd love *Bob* to jump with me!
Ice cream, soda, Delaware punch, this is the name of my honey bunch.
Bob, John, Ted, Fred, etc.

Catch a fox and put him in a box with:
Ann, Alice, Betty and etc.

I see London, I see France, I see Judy's underpants.

Not last night, but the night before,
24 robbers came knocking at my door.
As I ran out, they ran in, and hit me on the head with a rolling pin.

Mother, Mother, I am sick,
Send for the doctor, quick, quick, quick.
In comes the doctor, in comes the nurse,
In comes the lady with the alligator purse.
Out goes the doctor,
Out goes the nurse,
Out goes the lady with the alligator purse.

One childhood pastime that probably has passed into the lost world of children's games is a very special boys' game, Mumblety-Peg — played with jack knives in late spring when the ground was soft. When little brother was flying kites, the older brothers had acquired pocket knives. In a book *Active Games and Contests* by B. S. Mason and E. D. Mitchell, I discovered a fascinating set of rules, more complicated than any Japanese Tea Ceremony ever devised in the high social societies in Japan, India or any Oriental society.

Mumblety-Peg is an old pastime of tossing a pocket-knife from various positions so the blade will stick in the ground.

Equipment. — While any pocket knife may be used, the Boy-Scout knife is official for tournament play. The leather punch which this type of knife carries is used instead of the blade, thus protecting the player from cuts.

Matches. — A match consists of three long games or seven short games. The best two out of three long games or four out of seven short games determines the winner.

Playing Rules. — Players may either sit or kneel on the ground. All throws are made with the right hand unless otherwise specified below. The knife when thrown must stick in the ground so that the referee can place at least two fingers between the ground and the handle of the knife.

Each contestant performs the following series of stunts in order. The long game is for boys and the short game for girls.

The following series of stunts is that considered as official by the National Recreation Association.

PENKNIFE RULES (LONG GAME):

Front. — Knife on palm of right hand with blade toward finger tips, toss knife upward and inward causing blade to stick in ground.

Back. — Place knife on back of right hand toss as for front.

Punch. — Make a fist with right hand. Place knife handle across the fingernails with blade toward thumb; twist hand quickly toward the left, sticking blade into the ground.

Snaps. — Hold blade between thumb and forefinger of left hand with handle pointing toward the right. Strike the handle downward sharply with right hand, causing blade to stick into the ground.

Seven Pennies. — Hold blade between thumb and first finger of right hand with handle away from contestant and snap knife away from tosser, sticking it into the ground. This must be done seven times in succession.

Around the Horn. — Hold blade of knife between the index finger and thumb of right hand, as for Pennies, and swing the knife, with handle toward the ground, around the head from left to right; then snap away from tosser as in Seven Pennies.

Shave the Peg. — Place blade between the first and second fingers and hold with thumb, have handle pointing away from body and point of blade toward person tossing; snap knife away from tosser.

Cut Left. — Hold knife as for Pennies and snap downward across left arm striking left wrist with the right.

Cut Right. — Opposite to Cut Left.

Headings. — Same as for Seven Pennies except the handle of knife is touched against the forehead before snapping.

Chinnings. — Same as Headings except that chin is touched with handle.

Snaps. — (See Snaps) must be done three times in succession.

Drop In and Pull Out. — Hold knife handle between thumb and forefingers of right hand and drop the knife through a hole made by touching the tips of the forefinger and thumb of the left hand. After blade sticks in ground, pull knife back through the hole by the blade with the handle touching round and the index finger and thumb holding blade; snap as in *Seven Pennies.*

Shave the Barber. — Hold left hand with palm in and little finger toward the ground. Place knife flat against the palm of left hand with cutting edge toward tosser and handle toward the ground. With fingers of the right hand pull blade of knife toward the contestant, giving a downward snap.

Lady Dives. — Hold right hand vertical with back of it toward the players; place point of knife against the heel of the hand and the handle against the finger tips; push upward and forward, giving a loop effect to the knife.

Pinwheel. — With the handle at right angles to the right hand and the arm at right angles to the body, hold the point of the blade loosely betwen thumb and first finger; flip the knife toward the left with a downward push of the thumb.

Kick 'Em out. — Place handle of knife flat on palm of left hand with the blade protruding over the little finger side; strike blade downward with righthand.

Cop's Club. — Hold knife as for Seven Pennies, but flip toward tosser. Immediately strike upward with same hand causing knife to spin in opposite direction.

Tony Chestnut. — Starting at toe, place point of blade on end of shoe and snap away from player. Repeat same at knee, again at the chest, and then from front part of the head. The toe may be elevated and the point of the knife may be placed against thumb when snapping from chest.

Fingers. — Same as Pennies exept that the blade is held between the thumb and each finger consecutively. Two snaps are made with the first finger and thumb and one with the second, third and little fingers.

Johnny Jump the Fence. — Stick knife into ground at an angle and about one foot away. Place left hand with palm toward the knife and little finger touching the ground; with the right hand strike the knife and forward, causing it to go over the left hand or fence and stick into the ground.

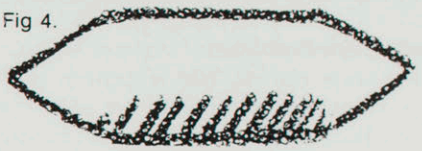
O-U-T Period. — Place point of knife on left wrist, and with right thumb and forefinger top of knife, snap to ground; at the same time say "O". Repeat at elbow and say "U", repeat at shoulder and say "T". Make a fist as in "Punch" and place knife along fingernails with blade toward little finger side; twist wrist inward quickly and say "period". These last four stunts must be performed consecutively in order to complete the game.

I believe that many of these games almost dwindled into oblivion because of the upsurge of the radio serials in the early 1930's when around four o'clock, we all rushed into the house to hear "Jack Armstrong — All American Boy", "Little Orphan Annie" or "Chandu the Magician". I also believe this period and World War II were instrumental in the decline of the Toy Cap Pistol as an active special toy, because of the need of gun powder.

These special games suffered their demise because of World War II. Mom became "Rosie the Riveter", Dad "went to War", Brother became a "block warden." The last street games were pretty well structured into special time slots in relation to time spent at home. After the War, television blossomed and Walt Disney's Mouseketeers swept up most of the children addicted to street games, especially those games needing special equipment.

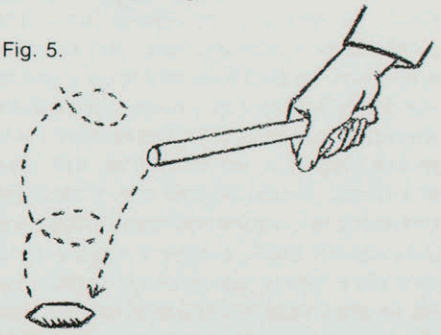
A game I played in the late 1920's has been identified by a neighbor as a game called "Pee Wee". The pee wee was a three inch piece of broom handle carved with pointed ends. Fig. 4 —

Fig 4.



It was placed on the curb and struck on one end with a two-foot section of the broom handle, Fig. 5

Fig. 5.



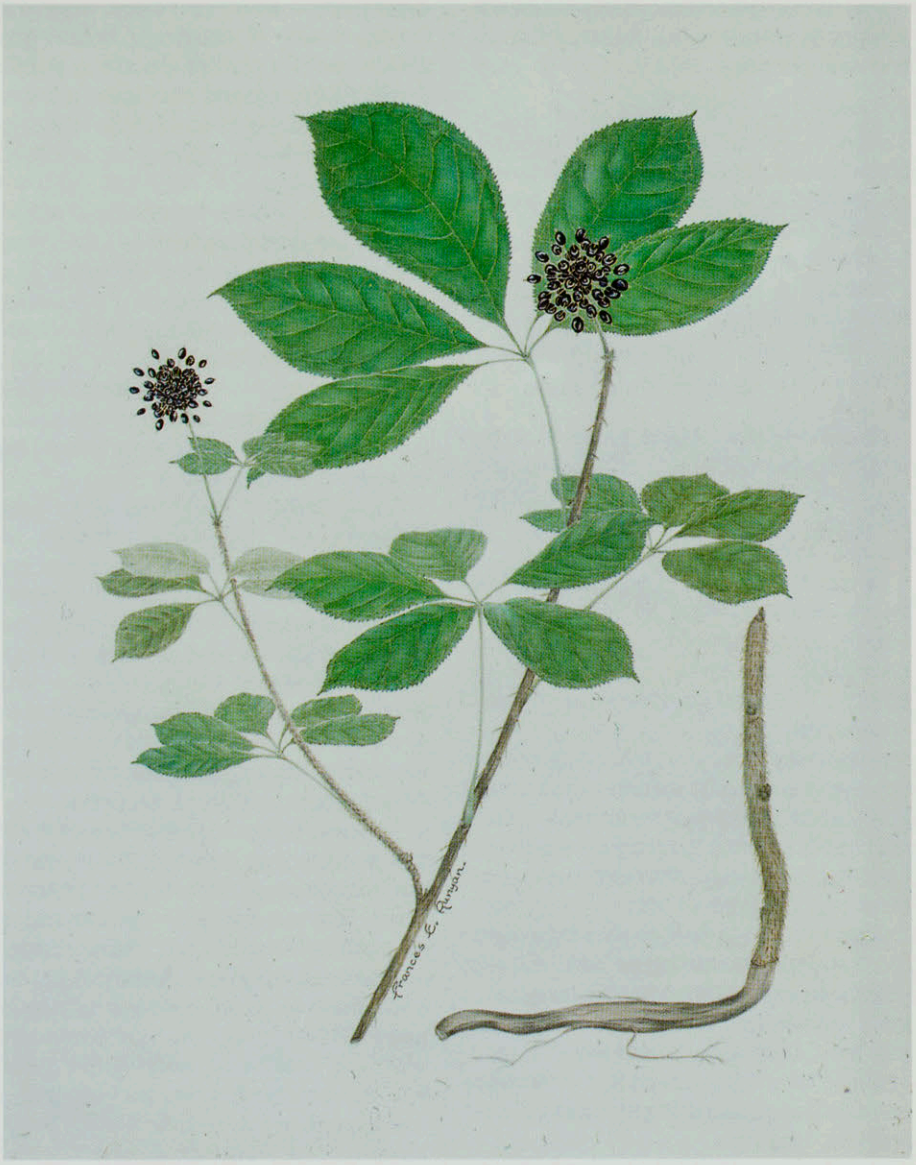
making "pee wee" flip up so it could be whacked forward, as "hit the bat". (Come to think of it, when did you last play hit the bat?)

My recollections of the street games during the 1920's and 30's in Hollywood don't hold a candle to the indoor games of the same period. However, I still feel a nostalgia for those games with their very special rules and chants that were evolved and controlled by the participants. The "organized fun" of today doesn't have the spontaneity of jacks, tops, comb and tissue harmonicas, Kazoos and button whirligigs. What I miss most of all after a rousing game was the five-cent chocolate flavored Coca-Cola at the local drug store soda fountain.

Robert Wade is chief of the Exhibitions Division of the Natural History Museum of Los Angeles County. He wrote a TERRA article on Tops, which he collects as a hobby; if he keeps up his nostalgia research he may influence children away from TV and outside in the daytime.

A Miraculous Plant from Siberia?

by **William Emboden**



Much excitement and much confusion has recently been generated over a plant which is being sold as "Siberian Ginseng." Sales of an elixir made from this plant are phenomenal, and at the present rate it seems unlikely that the suppliers will be able to keep up with the demand, even though the asking price is exorbitant (around ten dollars for a couple of ounces). One popular magazine for women recently ran an article on Siberian Ginseng advertising it as "a new variety of ginseng from behind the red curtain." The plant engendering all of this enthusiasm is *Eleutherococcus senticosus* and is not ginseng. Ginseng refers to either *Panax ginseng* or *Panax quinquifolium,* from Asia and North America respectively. The similarity between *Eleutherococcus* and *Panax* is comparable to that between a potato and a tomato. *Panax* and *Eleutherococcus* are both members of the family Araliaceae, and so is the ivy that grows on your hillside. Although these two genera are botanically distinct, they do seem to have certain properties in common. They function as an "adaptogen," to use the term coined by the Russians who have studied both of these plants extensively. In brief, an adaptogen is a naturally derived compound that is non-toxic and has the ability to increase one's resistance to a host of adverse influences such as stress, toxins, and some viral and bacterial agents. In addition, an adaptogen, according to the Russians, should possess some normalizing properties to stabilize high or low blood pressure, over or underactive endocrine glands, or sugar imbalances.

For over twenty years the U.S.S.R. has had a "Permanent Ginseng Council" devoted primarily to the study of Panax, but flexible enough to consider other possible adaptogens as well. The Far Eastern Center of the Siberian Division of the U.S.S.R. Academy of Science has also been giving much consideration to such plants. Recently, *Eleutherococcus* seems to have stolen the show for reason of its reputed wide range of pharmacological properties which are therapeutic much in the same way as ginseng. The focus of attention on preventative medicines from natural products has received wider attention from the scientific community in Russia than in the United States where screening for alkaloids has overshadowed all other research obscuring possibly broader aspects of pharmacological activity in plants. As a result, ever greater numbers

of people in the U.S. are daily turning to herb products in their regimen of health; these are screened by the Food and Drug Administration and meet most of the requirements of the Fair Practices Labeling Act. *Eleutherococcus* has met these requirements, although labeling it as "Siberian Ginseng" is highly questionable. Now most health food stores are selling this plant product that was put on the market in Russia eleven years ago. While the U.S.S.R. Ministry of Health labels the plant a stimulant, it has many alleged tranquilizing properties as well, and in this way seemingly alleviates those illnesses associated with stress. It would seem that stress is the key to the major illnesses plaguing people living in cosmopolitan areas of the world, and the consequences are many, ranging from heart disease to nervous breakdowns.

In a symposium held in 1964 in Russia and published in Vladivostok, it would seem that there is little that this spiny perennial plant cannot offer. One wonders why we have no record of its being employed medically at an earlier date. Some writers, confusing *Eleutherococcus* with *Panax,* trace its history back some four thousand years; such journalism is in error. The plant has a rather forbidding aspect and for that reason was known to Siberian peasants as "Devil's Bush," and "Touch-me-not," neither are names indicating that the plant would be used in medical practices in the homes of peasants. Part of the marketing campaign in the United States is to inextricably bind the histories of these two different plants; this is a grievous error. *Eleutherococcus* may be, as stated by Dr. Brekhman, one of the best known researchers on the plant, ". . . one of the most reliable and efficacious of all adaptogens presently known," but this does not bind it to *Panax* in any way other than the similarity of their therapeutic action. In fact, the symposium held under the Siberian branch of the U.S.S.R. Academy of Sciences maintained the differences between the two, and made comparisons only in the similarity of their pharmacological activity. The five-parted, compound leaf is deceptively similar, for neither the underground rhizome or the above ground morphological features are otherwise similar to ginseng. It would then be wise to avoid the common binomial "Siberian Ginseng" and regard that as being merely a trade name for an adaptogen with some properties similar to *Panax.*

One cannot help but be intrigued by the reports emanating from the U.S.S.R. symposium—cows producing more milk, chicks becoming mature hens in two months, bees giving thirty to sixty percent more honey and minks experiencing fifty percent fewer stillborn progeny. If all of this is so, it is quite a feat, that is if the Russians are not paying ten dollars for about a half a cup of the stuff—the current American tag. And yet, if it is as efficacious on humans as claimed, it is cheap at twice the price. A liquid extract is made from the roots, rhizomes, and leaves of the plant. Curiously enough, the Russians claim that the mixture of roots, rhizomes and leaves is more effective than comparable concentrations of either roots, rhizomes or leaves alone.

Mice on a treadmill placed over a floor that had been wired were forced to run a seemingly endless treadmill until they dropped to the floor and were subjected to an electrical shock. Ultimately they could run no longer and endured the shock. With the extract of *Eleutherococcus* the mice set new endurance records. Rats that were rendered immobile by being bound with their backs to a board for twenty-two hours suffered such stress as to cause a swelling of the adrenal glands as well as aberrant function and dimunition of the spleen, adrenal glands and thymus. A group that had been first treated with *Eleutherococcus* showed none of these stress symptoms, according to the Soviet workers. Furthermore, they were able to endure considerably more fatigue.

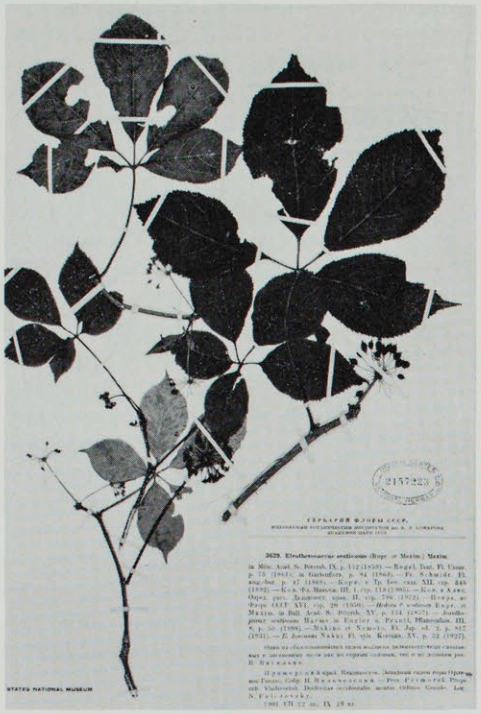
The Soviet government approved the use of *Eleutherococcus* on certain groups of State employees, and the results were very encouraging. Cosmonauts were free of the symptoms usually attendant with space missions of some duration; the dizziness and fatigue associated with some earlier missions were absent. Also, among the personnel at the Central Mine Rescue Station at Brandis, the metabolism shifts that were common to workers were reported to have disappeared after a period of ingesting extracts of this herb. Blood cell counts were normalized and symptoms of anxiety disappeared. These same scientists experimenting on radiation disorders found the plant extract efficacious in combating radiation sickness. Patients who are given cobalt treatments suffer such side effects as vomiting, diarrhea, headache, anemia, and hemorrhaging. These symptoms were mollified by *Eleutherococcus.* Experiments with rats in which 1620 and 7000 R units of radiation were administered for prolonged periods of time showed that the *Eleutherococcus*-treated animals lived twice as long as the control group, and there was a greater "normalization" of other bodily indices. Given the ever-increasing amounts of strontium 90 in bone and fatty tissues of people throughout the world, if this plant is capable of protecting the body against radiation damage, it may indeed be labeled "miraculous." Asserting that there is an antioxidant action on living cells subjected to *Eleutherococcus.* Russian experimenters worked with mice and increased life expectancy by ten percent by including plant extracts in their drinking water. Many individual testimonials were presented in the symposium on *Eleutherococcus* and ginseng, but one must keep in mind that these are not necessarily the result of careful scientific experimentation, and there are no control groups which permit a dispassionate statistical assay on the effects. Such testimonials are extremely interesting, but lack scientific verification. One of the widespread claims is that the plant extract increases virility and sexual prowess; this accounts for a large part of the sale in the United States, for this is a frequent assertion in popular accounts of this plant's virtues. That Americans, and other nations, so avidly seek out reputed aphrodisiacs is indicative of either widespread impotence, or an exaggeration of the role of sexuality in human behavior—perhaps both.

It was the Russian scientist I. I. Brekhman who in 1963 announced the finding of this "new medicinal herb" at the Second International Pharmacological Meeting in Prague. His findings that the plant was efficacious in treating diabetes, cancer, neurosis, metabolic imbalance, hypertension, etc., created much controversy and some skepticism. In comparing the plant to *Panax ginseng,* in a later paper, Brekhman noted the many advantages that *Eleutherococcus* has over ginseng, these being a longer duration in which the material is effective, the absence of sleep disturbances, the lessening of hyperactivity, a much greater anti-stress effect, and its pronounced activity on acute radiation sickness, diabetes, and some forms of cancer. He remarks that the main advantage is that active principles of *Eleutherococcus* are less subject to seasonal variation. It was a Russian colleague, Ovadov, who enumerated and

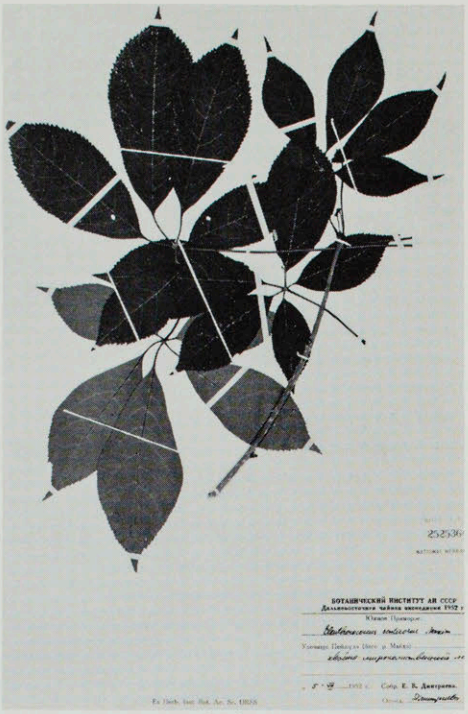
elucidated *Eleutherococcus* glycosides A, B, D, and E; C was found to be non-glycosidic. As a group, these are referred to as eleutherosides. One curious finding in a host of data is that the root was more efficacious than the crude glycoside fraction isolated from it. Eleutheroside E had the most pronounced anti-stress activity, and was dubbed "syringaresinol diglucoside." The conclusion from these findings would seem to be that it is better to use whole root extracts than isolates, a principle that is often ignored in modern medicine.

Since this plant is abundant in the Far East, supplies will be regulated by the Soviets and Chinese. Will pharmacologists in the United States vindicate these findings? Moreover, will it effect sales to any degree if they don't? At present, *Eleutherococcus* sales have reached a feverish pitch, and it is difficult for many herbalists and health food stores to get an ample supply. I found myself confronted with the prospect of missing out on this elixir, so I hastened to my favorite herbalist to purchase the brown syrupy liquid at five dollars per ounce (thirty-three percent of which was alcohol, but I didn't mind that). After two weeks of a teaspoonful per day in my morning cranapple juice (twice the recommended dosage), I can say that I feel my usual self. Assuming I continue this therapy, gentle reader, and pass through the flu and other winter disasters unscathed, perhaps I shall carry my investigations into the literature surrounding this plant even further. For now, I gulp a bit each day, knock on wood, and keep my fingers crossed.

William Emboden is professor of Biology at California State University, Northridge, and Research Associate in Botany at the Natural History Museum of Los Angeles County. He has expanded TERRA articles into three books, Narcotic Plants, Bizarre Botany, *and* Sarah Bernhardt, *the last of which will be out in May.*



"Siberian ginseng" from the collection in the herbarium of the Institute of the Botanical Academy of Sciences, USSR (now in the U.S. National Herbarium)



An herbarium specimen of Eleutherococcus from the National Herbarium collected in the village of Primorsk near Vladivostock, Russia

A commercial product comprising the root of *Eleutherococcus* and alcohol

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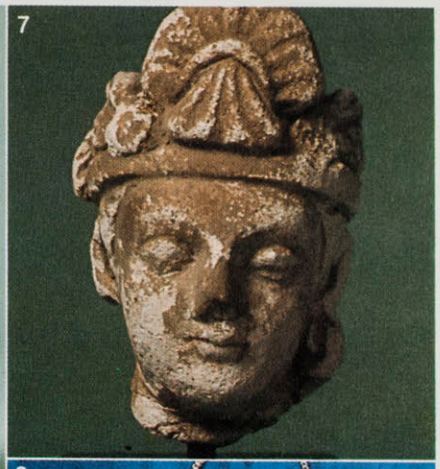


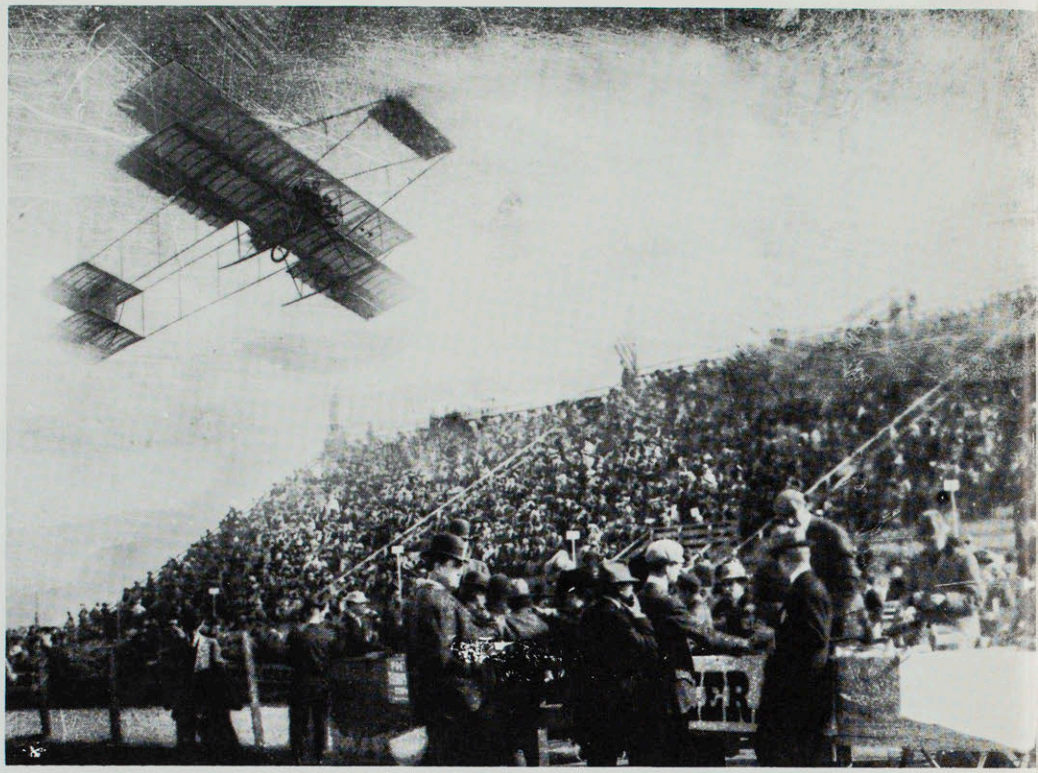
Photography Larry Reynolds

continued from page 2

(Paulhan flew both a Farman biplane and a Bleriot monoplane in the meet — I can't recall which plane he flew on which occasion.) In any case, after he took off we all settled down to rest our feet and wait. No one else had gone up. It was too windy that day. Paulhan's flight was expected to take about an hour.

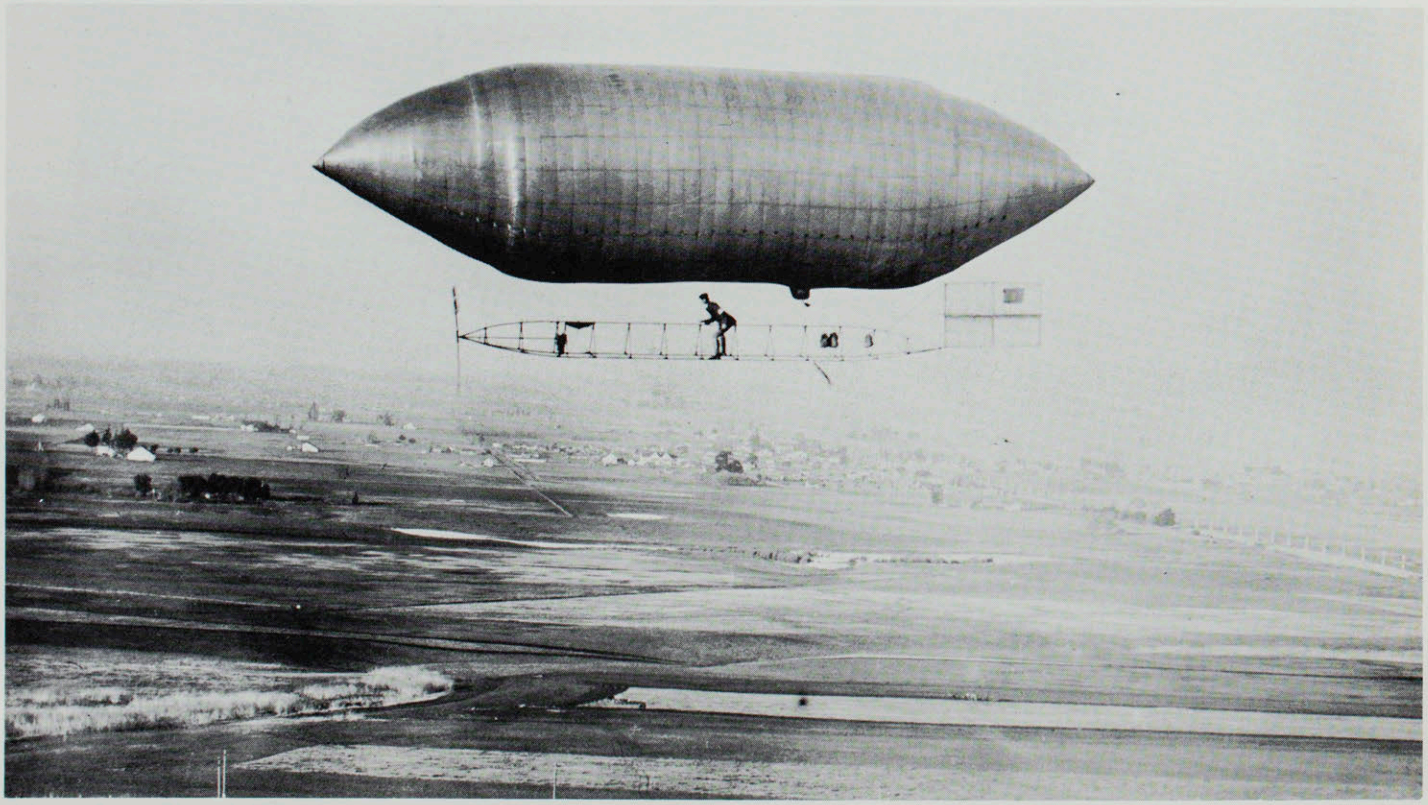
Then far, far away was a little speck in the sky, not as big as a sparrow, but it wasn't flying in circles like a bird, it was headed directly toward us, Paulhan's plane and Paulhan flying it! He had been fighting head winds all the way back. The relief and the excitement were overwhelming. He had broken two world records at the meet, altitude on the 12th, and time, 1 hour, 58 minutes and 32 seconds, on the 17th, the day before. But this day is the one I recall most vividly. Exhausted by the stress of fears and thrills, we stumbled down the road to the waiting red cars, unconscious of the jostling and jolting.

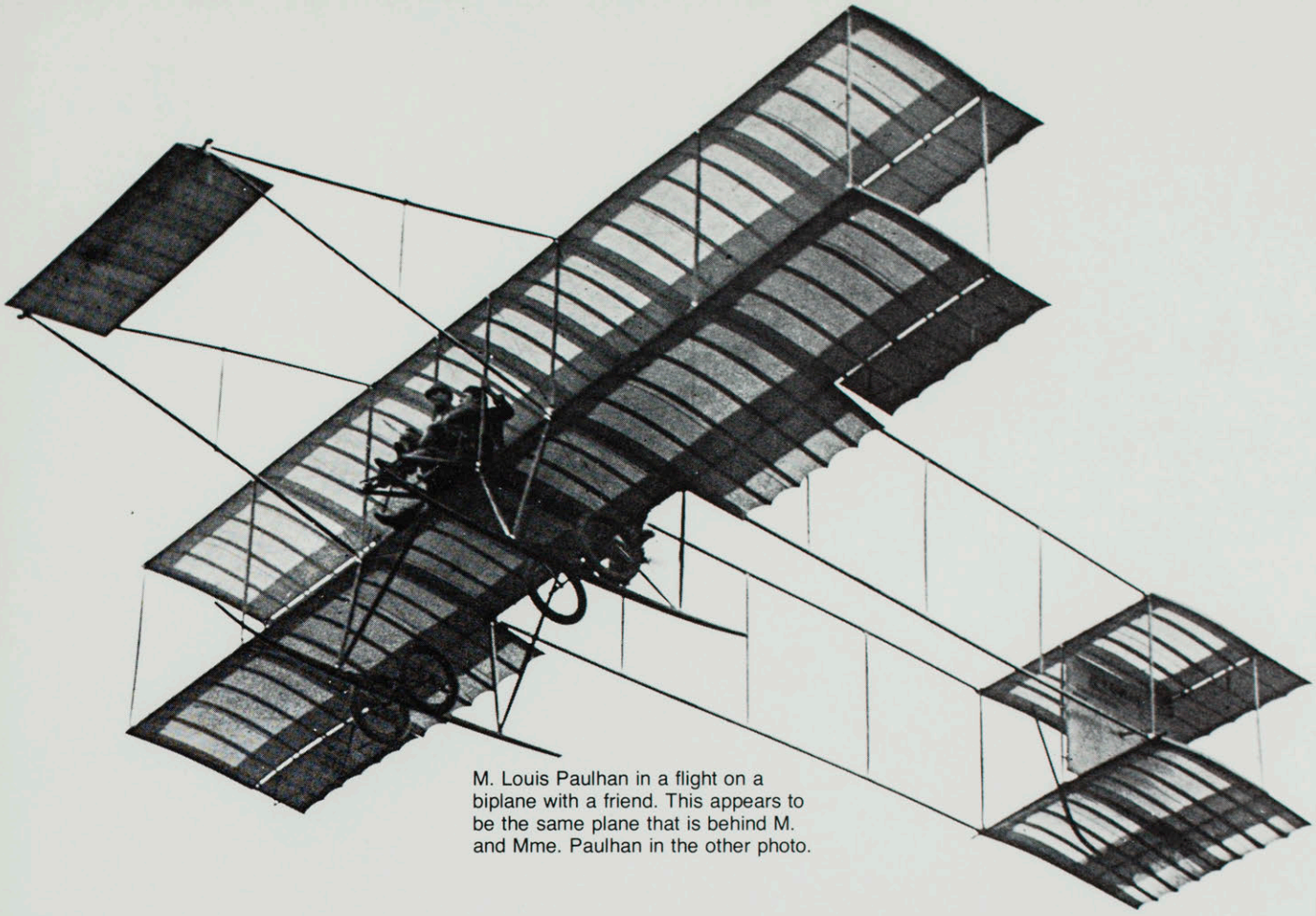
My father did go back for the last days of the meet, but my mother and I refused. We had had the best — anything more would just detract from the climax of that day.



The grandstand at Dominguez Field, with Paulhan and his plane flying over, January, 1910. This is a composite, using the photo on the right; Paulhan and friend in the plane, plus a shot of the grandstand, with the picture of the plane reversed.

The "Balloon" photo is of Roy Knabenshue (possibly; there are no captions so we can't be positive.)





M. Louis Paulhan in a flight on a biplane with a friend. This appears to be the same plane that is behind M. and Mme. Paulhan in the other photo.

Mme. Paulhan and friend at Dominguez Field, January, 1910.

M. Louis Paulhan and his wife, Mme. Paulhan. She accompanied him on some of his flights, and did so at the Dominguez meet of January, 1910.

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